(JIML) JOURNAL OF INNOVATIVE MATHEMATICS LEARNING
Volume 8, No. 3, September 2025
P-ISSN 2621-4733
E-ISSN 2621-4741
https://dx.doi.org/10.22460/jiml.v8i3.p23907

HOW GOOD MATHEMATICAL CRITICAL THINKING SKILLS OF ELEMENTARY SCHOOL STUDENTS? THE CASE ON FRACTION MATERIAL

Euis Nurlela[1], Heris Hendriana[2], Tatang Supriatna[3], Nelly Fitriani[4]
[1]IKIP Siliwangi, Jl.Terusan Jend. Sudirman, Cimahi, Indonesia.
euisnurlela80@gmail.com
[2]IKIP Siliwangi, Jl.Terusan Jend. Sudirman, Cimahi, Indonesia.
herishen@ikipsiliwangi.ac.id
[3]IKIP Siliwangi, Jl.Terusan Jend. Sudirman, Cimahi, Indonesia.
statang776@gmail.com
[4]IKIP Siliwangi, Jl.Terusan Jend. Sudirman, Cimahi, Indonesia.
nellyfitriani@ikipsiliwangi.ac.id

ARTICLE INFO

Article history:

Received Jul 05, 2024
Revised Mar 17, 2025
Accepted Apr 14, 2025

Keywords:

Mathematical Critical Thinking Skills
Fraction
Elementary School Students

ABSTRACT

Critical mathematical thinking skills are fundamental abilities that students must develop to succeed in mathematics. In learning mathematics on fraction material, the critical mathematical thinking skills of grade V students at Gununghalu 1 Elementary School are not yet optimal. This study seeks to assess the essential mathematical thinking skills of fifth-grade students. The participants in this study consisted of 51 fifth-grade elementary school students from Ciranjang during the 2023/2024 academic year. The object of this research is students' mathematical critical thinking skills, efforts made to develop mathematical critical thinking skills, and obstacles faced in efforts to improve mathematical critical thinking skills. This research method is descriptive quantitative. The data collection techniques used were observation, interview and test. The instrument used to obtain the data in this study is a matter of description test, which amounted to 5 questions. The study revealed that fifth grade students demonstrated an average critical thinking ability of 51%, which falls into the low category. Among the various indicators assessed, the highest score was seen in the analysis of statements, reaching 76%, while the lowest score was in the evaluation of the truth of statements, which stood at just 26%. From this analysis, we can conclude that the mathematical critical thinking skills of fifth grade elementary school students remain at a low level.

Corresponding Author:
Euis Nurlela,
Department of Mathematics Education,
Institut Keguruan dan Ilmu Pendidikan Siliwangi,
Jl. Terusan Jend. Sudirman, Cimahi, Indonesia
Email: euisnurlela80@gmail.com

How to Cite:

Nurlela, E., Hendriana, H., Supriatna, T., & Fitriani, N. (2025). How Good Mathematical Critical Thinking Skills of Elementary School Student? The Case on Fraction Material. *JIML*, 8(3), 315-320.

INTRODUCTION

A key objective of 21st-century education is to cultivate students' critical thinking skills. This 21st century learning competency leads to 4C, namely critical thinking and problem solving,

creativity, communication skills, and collaboration (Kemendikbud, 2017). The content standards for elementary and secondary education in mathematics, which are regulated in the Regulation of the Minister of National Education Number 22 of 2006 which was stipulated on May 23, 2006, emphasize the importance of teaching mathematics for all students from elementary school level. The purpose of this standard is to equip students with logical, analytical, systematic, critical, and creative thinking skills, while improving their ability to work together (Yunita et al, 2018).

Based on the results of research conducted by Ati and Setiawan (2020), mathematics is one of the important subjects in elementary education. This subject plays a role in developing logical, structured, critical, and creative thinking skills. The goal of learning mathematics is to prepare students to face changes in life and the dynamics of the world that continues to develop. This can be achieved through exercises that encourage them to act with logical, rational, critical, careful, efficient, and effective thinking (Syafruddin et al, 2020,Sa'adila et al, 2022). Rizky, Ariyanto, & Sutrisno (2017) added that mathematics learning needs to direct students to develop critical thinking skills. The development of critical thinking skills must be oriented towards correct and rational perception, analysis of assumptions and argument bias, and logical interpretation (Kowiyah, 2012; Umam et al, 2017). Enhancing critical thinking in mathematics education can significantly improve an individual's ability to think logically, systematically, and accurately when tackling mathematical problems.

The critical thinking skills of students in Indonesia are relatively low, as revealed in the results of the Trend in Mathematics and Science Study (TIMSS) survey. In 2015, Indonesia ranked 45th out of 48 countries surveyed (Krisiandi, 2016). With these results, it can be assumed that the reasoning ability and critical thinking skills of students in Indonesia are also at a fairly low level. Research conducted at SDN Gununghalu 1 revealed that many fifth-grade students remain passive during mathematics lessons, rarely asking questions about the material being taught. This lack of inquiry suggests that their critical thinking skills are underdeveloped, as students who actively engage by asking questions typically demonstrate stronger critical thinking abilities. Thus, the development of critical thinking skills goes beyond mere learning; it must also be reinforced by assessment tools that accurately reflect these skills. In line with the opinion of Kartimi & Liliasari (2012) that critical thinking requires practice, one of which is the habit of working on problems that develop critical thinking. This study will explore students' critical thinking skills as assessed through essay questions designed to measure their thinking abilities.

Several experts describe critical thinking using various phrases, yet their definitions convey similar meanings. Ennis (Hendriana, 2017) defines critical thinking as reflective thinking that is reasoned and focused on determining what to believe or what to do. Critical thinking skills are cognitive activities that involve the use of reason. The learning process for critical thinking includes various mental activities, such as observation, grouping, selection, and assessment and decision making (Amri, 2015). According to Purwati (2016) critical thinking is a process, aimed at making reasonable decisions about what to believe and what to do. Critical thinking skills are a process that involves identifying various assumptions and combining previously owned knowledge. This process aims to produce relevant knowledge and allows one to generalize mathematical situations in a reflective manner. These abilities include problem solving, formulating conclusions, calculating possibilities, and decision making (Kusumawati et al, 2022).

Critical thinking is a logical thinking process by utilizing the knowledge, understanding or skills possessed to solve a problem or appropriate retrieval accompanied by reasons and evidence. (Kholifah: 2017). Zulfa (2017) states that critical thinking has the meaning of the power of thinking that must be built by students so that it becomes a character or personality that is

embedded in the lives of students to solve all the problems of their lives. Ennis (Hendriana: 2017: 96) elaborates on critical thinking indicators in detail as follows: a) focusing on questions; b) analyzing and explaining questions, answers, and arguments; c) considering reliable sources; d) deducing and analyzing deduction; e) inducing and analyzing induction; f) formulating explanations, hypotheses, and conclusions; g) compiling valuable considerations; and h) interacting with others. The aim of this study is to analysis the critical thinking skills of elementary school students at Gununghalu 1 Primary School.

METHOD

This research uses a type of quantitative descriptive method. This research describes the analysis of students' critical thinking skills. The subjects of this study were 51 fifth grade students of SDN Gununghalu 1. The data collection techniques used were observation, interview and test. The instrument used to obtain the data in this study is a matter of description test, which amounted to 5 questions. From the results of students' critical mathematical thinking ability tests, data is processed and analyzed based on the indicators of each question item. After obtaining the research results, student scores were converted into criteria in Table 1.

Table 1. Score Conversion

Interval Score	Category
$x > \mu + 1{,}5\sigma$	Very High
$\mu + 0{,}5\sigma < x < \mu + 1{,}5\sigma$	High
$\mu - 0{,}5\sigma < x < \mu + 0{,}5\sigma$	Medium
$\mu - 1{,}5\sigma < x < \mu - 0{,}5\sigma$	Low
$x < \mu - 1{,}5\sigma$	Verry Low

Source : (Azwar:2010)

Description

μ = Mean Ideal Score

σ = Standard Deviation

x = Total score obtained by the student

To obtain the student's grade, use the following formula:

$$Grade = \frac{Score\ Obtained}{Max.Score} \times 100\%$$

RESULTS AND DISCUSSION

Results

This study aims to analyze the level of critical thinking skills of fifth grade students of SDN Gununghalu 1 on fraction addition material. The research data was gathered from the outcomes of a critical thinking skills test that utilized descriptive questions. Following the collection of these test results, the data was analyzed and categorized to evaluate the level of critical thinking skills among the students. The findings regarding students' critical thinking skills are presented in Table 2.

Table 2. Description Of Students' Critical Thinking Skills

Level of Students' Critical Thinking Skills	Percentage

Verry High	0%
High	12%
Medium	33%
Low	51%
Verry Low	4%

The results of the critical thinking test presented in Table 2 reveal a noteworthy distribution of skill levels among students. Specifically, 4% of the students exhibit very low critical thinking skills, while 51% fall into the low category. Additionally, 33% of students demonstrate medium-level skills, and 12% are categorized as having high critical thinking abilities. Notably, there are no students who reach the very high level of critical thinking skills.

In addition to evaluating each student's abilities, the data were also assessed according to various indicators of critical thinking. This study focused on five key indicators of critical thinking skills, which are: verifying the truth of a statement, identifying alternative solutions to problems, analyzing accuracy, evaluating the problem-solving process, and formulating questions based on a set of information while providing detailed explanations in their responses. Detailed results from the students' critical thinking assessments can be found in Table 3.

Tabel 3. Test Results for Each Critical Thinking Indicator

Critical Thinking Indicator	Percentage	Category
Proving the truth of a statement	26%	Verry Low
Seeking alternative problem-solving approaches	51%	High
Analyzing the accuracy of the problem-solving process	76%	Verry High
Evaluating the problem-solving process	50%	High
Formulating questions about a series of information and their answers with explanations	24%	Verry Low
Average Percentage for Each Indicator	**43%**	**Medium**

The analysis presented in Table 3 revealed that students' critical thinking skills, assessed across various indicators, fell into three distinct categories: very low, high, and very high. Notably, the average percentage for each indicator was classified within the medium category.

Discussions

According to the data from the critical thinking test, 4% of students demonstrate very low critical thinking skills, while 51% exhibit low critical thinking abilities. Furthermore, 33% of students possess moderate critical thinking skills, and 12% show high critical thinking proficiency.

The analysis of various critical thinking skills indicators yielded the following results: For the indicator related to proving the truth of a statement, the average percentage was a mere 26%, categorizing it as very low. In contrast, the indicator for finding alternative problem-solving methods had an average of 51%, placing it in the high category. The analysis of the correctness in the problem calculation process showed an impressive average of 76%, categorizing it as very high. Additionally, the evaluation of the problem-solving process resulted in an average percentage of 50%, which is classified as high. Finally, the indicator for compiling questions

based on a series of information and providing explanations obtained an average of just 24%, also falling into the very low category. Overall, the average percentage across all indicators was 43%, which is considered moderate.

There are previous studies that support the above problems, such as research conducted by Amelia et al. (2023). It has been observed that fourth-grade students' critical thinking skills when addressing higher-order thinking skills (HOTS) questions remain at a low level.

This is in line with previous research conducted by Hendryawan, Yusuf, Wachyar, Siregar, & Dwiyanti (2017) which states that the lack of implementation of critical thinking in mathematics learning has led to low critical thinking skills of students.

Based on the research results of Herdiman, et al. (2018) stated that students' critical mathematical thinking skills are still relatively low. They have not been able to provide logical reasons or conclusions when facing various problems. This is due to the lack of understanding of students in determining the right formula and solving problems systematically.

CONCLUSION

According to the results of the mathematical critical thinking skills test, the data reveals that 4% of students exhibit very low critical thinking skills, while 51% demonstrate low skills. Additionally, 33% of students fall into the category of moderate critical thinking skills, and 12% are classified as having high critical thinking abilities. Upon analyzing the five indicators of critical thinking skills, it was found that two indicators were categorized as low, two as high, and one as very high. In summary, these findings indicate that the critical thinking skills of 5th grade students remain below expectations.

ACKNOWLEDGMENTS

I extend my heartfelt gratitude to everyone who has supported and contributed to this research. I hope that the findings will prove valuable and make a significant impact in the field of education, particularly in mathematics education.

REFERENCES

Amelia, Mendri, M, Marga, Retta A, Lara, Syafilin, S. (2023). Analis Kemampuan Berpikir Kritis Siswa Dalam Menyelesaikan Soal Matematika Kelas IV SD Negeri 6 Talang Kalapa. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 1(2)

Amri, S. (2015). Implementasi Pembelajaran Aktif dalam Kurikulum 2013.Jakarta: Prestasi Pustakarya.

Ati, T. P., & Setiawan, Y. (2020). Efektivitas problem based learning-problem solving terhadap kemampuan berpikir kritis dalam pembelajaran matematika siswa kelas V. *Jurnal Cendekia*, *4*(1), 294-303.

Azwar, S.(2010). *Tes Prestasi Fungsi Pengembangan dan Pengukuran Prestasi Belajar*. Yogyakarta: Pustaka Pelajar.

Hendriana, Heris, Euis Eti Rohaeti, dan Utari Sumarmo. (2017). *Hard Skills dan Soft Skills Matematik Siswa*. Bandung: Refika Aditama.

Hendryawan, S., Yusuf Y., Wachyar, T. Y., Siregar, I., &Dwiyanti, W. (2017). Analisis Kemampuan Berpikir Kritis Matematis Siswa Smp Tingkat Rendah Pada Pembelajaran Berbasis Masalah Dengan Green's Motivational strategies. *Aksioma*,8(2),50-58

Herdiman, I., dkk. (2018). Kemampuan Berpikir Kritis Matematik Siswa SMP Pada Materi Lingkaran. *Jurnal Prisma*, VII(1). https://jurnal.unsur.ac.id/prisma.

Kartini & Liliasari. (2012). Pengembangan Alat Ukur Berpikir Kritis Pada Konsep Termokimia Untuk Siswa SMA Peringkat Atas dan Menengah. *Jurnal Pendidikan IPA Indoneesia*, 1 (2), 21 – 26.

Kementerian Pendidikan dan Kebudayaan. (2017). Pendidikan Karakter Dorong Tumbuhnya Kompetensi Siswa Abad 21. [Online]. Tersedia: https://www.kemdikbud.go.id/main/blog/2017/06/pendidikan-karakter-dorong-tumbuhnya-kompetensi-siswa-abad-21 [Diakses pada 28 September 2023].

Kholifah.(2017). Analisis kemampuan Berpikir Kritis Matematis Siswa SMP Kelas IX. A*Skripsi Universitas Islam Negeri Syarif Hidayatulloh*. Jakarta.

Kowiyah. (2012). Kemampuan Berpikir Kritis. *Jurnal Pendidikan Dasar*,3(5), 175 – 179.

Krisiandi. (2016). Kompas Nasional. Dipetik 19 Oktober 2017, dari Kompas.com: http://nasional.kompas.com/read/2016/12/15/23091361/daya.imajinasi.siswa.lemah

Kusumawati, I. T., Soebagyo, J., & Nuriadin, I. (2022). Studi kepustakaan kemampuan berpikir kritis dengan penerapan model PBL pada pendekatan teori konstruktivisme. *JURNAL MathEdu (Mathematic Education Journal)*, *5*(1), 13-18.

Purwati (2016). Analisis kemampuan Berpikir Kritis dalam Menyelesaikan Masalah Persamaan Kuadrat Pada Pembelajaran Model Creative Problem Solving. *Jurnal Kadikma*,7(1) 84.

Rizky, I De, Ariyanto , L.,& Sutrisno (2017). Meningkatkan Kemampuan Berpikir Kritis Matematis Siswa. *In Prosiding – SEMINAR NASIONAL MATEMATIKA DAN PENDIDIKAN MATEMATIKA(2nd SENATIK)* (PP 139- 145).

Sa'adilla, S., Sofiyan, S., & Fadilah, F. (2022). Analisis Kemampuan Berpikir Kritis Matematis Siswa Dengan Menggunakan Model Teams Games Tournament (Tgt) Pada Pembelajaran Matematika. Jurnal Ilmiah Matematika Realistik, 3(1), 28-35. https://doi.org/10.33365/ji-mr.v3i1.1688

Sugiono, (2016). *Metode Penelitian Kuantitatif,Kualitatif dan R&D*. Bandung: CV. ALFABETA

Syafruddin, I. S., & Pujiastuti, H. (2020). Analisis Kemampuan Berpikir Kritis Matematis: Studi Kasus pada Siswa MTs Negeri 4 Tangerang. Suska Journal of Mathematics Education, 6(2), 089-100

Umam, K, Suswandari, N. A., Wibowo, I. T., & Rohim, S. (2018). The Effect of think – Pair – Share Cooperative Learning Model Asisted With ICT on Mathematical Problem Solving Ability Amoong Junior High School Student. *Paper di sajikan dalam proceddings of the 26rd International conference on Computers In Education (ICCE 2018), Christchurch, New Zealand* (pp 94 – 98).

Yunita, N., Rosyana, T., & Hendriana, H. (2018). Analisis kemampuan berpikir kritis matematis berdasarkan motivasi belajar matematis siswa smp. JPMI (Jurnal Pembelajaran Matematika Inovatif), 1(3), 325-332. https://doi.org/10.22460/jpmi.v1i3.p325-332

Zulfa, Isna Amalia, (2017). Kemampuan Berpikir Kritis Peserta Didik Kelas VII Berdasarkan Implementasi Pada Model Pembelajaran Creative Problem Solving Dengan Strategi Talking Stick. *Skripsi Universitas Negeri Semarang*. Semarang.